AMENDMENTS TO THE CLAIMS

1. (Original) A visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized by including a sponge-like porous structure (B) containing an anatase-type titanium oxide coating formed on a surface of a sponge-like porous structural body (A) which has a porosity of 85 vol% or more,

said sponge-like porous structural body (A) being composed of one material selected from the group consisting of (a) to (e):

(a) carbon and either or both of silicon and a silicon alloy;

(b) silicon carbide and at least one material selected from the group consisting of silicon, a silicon alloy, and carbon;

(c) silicon nitride and at least one material selected from the group consisting of silicon, a silicon alloy, carbon, and silicon carbide;

(d) amorphous carbon; and

(e) carbon and one metal selected from the group consisting of titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, ruthenium, rhodium, palladium, silver, platinum, and gold.

2. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 1, wherein:

said sponge-like porous structural body (A) contains a carbon and either or both of silicon and a silicon alloy; and

said sponge-like porous structure (B) has a sponge-like base structure with crosslinks which have an average thickness of 1 mm or less and contains silicon and carbon in a Si/C molar ratio of 0.1 to 2.

3. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 1, wherein:

said sponge-like porous structural body (A) contains silicon carbide and either or both of silicon and a silicon alloy; and

said sponge-like porous structure (B) has a sponge-like base structure with crosslinks which have an average thickness of 1 mm or less and contains silicon and silicon carbide in a Si/SiC molar ratio of 0.1 to 4.

4. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 1, wherein:

said sponge-like porous structural body (A) is composed of carbon and titanium; and

said sponge-like porous structure (B) has a sponge-like base structure with crosslinks which have an average thickness of 1 mm or less and contains titanium and carbon in a Ti/C molar ratio of 0.1 to 2.

5. (Original) A visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized in that said filter has a sponge-like porous structure (B) having a surface on which a titanium oxide coating is provided,

wherein said sponge-like porous structure (B) is prepared by: immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing carbon and either or both of silicon and a silicon alloy and having a porosity of 85 vol% or more; drying said immersed structural body (A); and thereafter firing said dried structural body (A) at 100°C to 800°C in an oxidizing atmosphere.

6. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 5, wherein said sponge-like porous structural body (A) is composed of carbon and either or both of silicon and a silicon alloy.

7. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of either one of claims 5 and 6, wherein: said sponge-like porous structure (B) has a sponge-like base structure with crosslinks

which have an average thickness of 1 mm or less and contains silicon and carbon in a Si/C molar ratio of 0.1 to 2.

8. (Original) A visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized in that said filter has a sponge-like porous structure (B) having a surface on which a titanium oxide coating is provided,

wherein said sponge-like porous structure (B) is prepared by: immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing silicon carbide and at least one material selected from the group consisting of silicon, a silicon alloy, and carbon and having a porosity of 85 vol% or more; drying said immersed structural body (A); and thereafter firing said dried structural body (A) at 100°C to 800°C in an oxidizing atmosphere.

9. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 8, wherein:

said sponge-like porous structural body (A) contains silicon carbide and either or both of silicon and a silicon alloy;

said sponge-like porous structure (B) has a sponge-like base structure with crosslinks which have an average thickness of 1 mm or less and contains silicon and silicon carbide in a Si/SiC molar ratio of 0.1 to 4.

10. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of either one of claims 8 and 9, wherein said sponge-like porous structural body (A) is composed of silicon carbide and either or both of silicon and a silicon alloy.

11. (Original) A visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized in that said filter has a sponge-like porous structure (B) having a surface on which a titanium oxide coating is provided,

wherein said sponge-like porous structure (B) is prepared by: immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing silicon nitride and at least one material selected from the group consisting of silicon, a silicon alloy, carbon, and silicon carbide and having a porosity of 85 vol% or more; drying said immersed structural body (A); and thereafter firing said dried structural body (A) at 100°C to 800°C in an oxidizing atmosphere.

12. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of any one of claims 1, 5, 6, 8, 10, and 11, wherein: the silicon alloy contains at least one material selected from the group consisting of magnesium, aluminum, titanium, chromium, manganese, iron, cobalt, nickel, copper, zinc, zirconium, niobium, molybdenum, and tungsten.

13. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of any one of claims 1, 5, 6, 8, 10, and 11, wherein: said sponge-like porous structure (B) contains free silicon.

14. (Original) A visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized in that said filter has a sponge-like porous structure (B) having a surface on which a titanium oxide coating is provided,

wherein said sponge-like porous structure (B) is prepared by: immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing amorphous carbon and having a porosity of 85 vol% or more; drying said immersed structural body (A); and thereafter firing said dried structural body (A) at 100°C to 500°C in an oxidizing atmosphere..

15. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 14, wherein said sponge-like porous structure (A) is composed of amorphous carbon.

16. (Original) A visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized in that said filter has a sponge-like porous structure (B) having a surface on which a titanium oxide coating is provided,

wherein said sponge-like porous structure (B) is prepared by: immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing carbon and one metal selected from the group consisting of titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, ruthenium, rhodium, palladium, silver, platinum, and gold and having a porosity of 85 vol% or more; drying said immersed structural body (A); and thereafter firing said dried structural body (A) at 100°C to 500°C in an oxidizing atmosphere.

17. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 16, wherein:

said sponge-like porous structural body (A) is composed of carbon and titanium.

18. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of claim 17, wherein said sponge-like porous structure (B) has a sponge-like base structure with crosslinks which have an average thickness of 1 mm or less and contains titanium and carbon in a Ti/C molar ratio of 0.1 to 2.

19. (Original) The visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of any one of claims 1, 5, 8, 11, and 16, wherein the carbon is amorphous carbon.

20. (Currently Amended) A purifier device, being characterized by comprising the visible-light-responsive three-dimensional fine cell-structured photocatalytic filter of any one of claims ~~1 to 19~~1, 5, 8, 11, 14 and 16.

21. (Original) The purifier device of claim 20, comprising:

a container having a fluid inlet and a fluid outlet on opposite sides and an external optically transparent area allowing visible and/or ultraviolet light to pass therethrough; and

a photocatalytic filter provided inside the container,

wherein the photocatalytic filter purifies fluid coming in through the fluid inlet by visible and/or ultraviolet light received through the optically transparent area and discharges the purified fluid through the fluid outlet,

said purifier device being capable of functioning under visible light,

wherein the photocatalytic filter contains a filter unit containing the visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, the filter being planar.

22. (Original) The purifier device of claim 20, comprising:

a container having a fluid inlet and a fluid outlet on opposite sides;

an annular photocatalytic filter, provided inside the container, having a cylindrical space therein; and

a light source, provided in the cylindrical space of the annular photocatalytic filter, for shining visible and/or ultraviolet light,

wherein the photocatalytic filter purifies fluid coming in through the fluid inlet by the visible and/or ultraviolet light shone by the light source and discharges the purified fluid through the fluid outlet,

said purifier device being capable of functioning under visible light,

wherein the photocatalytic filter contains a filter unit containing the visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, the filter being annular.

23. (Original) A method of manufacturing a visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized by the sequential steps of:

immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing carbon and either or both of silicon and a silicon alloy and having a porosity of 85 vol% or more;

drying said immersed structural body (A); and

firing said dried structural body (A) at 100°C to 800°C in an oxidizing atmosphere.

24. (Original) The method of claim 23, wherein said sponge-like porous structural body (A) is composed of carbon and either or both of silicon and a silicon alloy.

25. (Currently Amended) The method of claim 23~~either one of claims 23 and 24~~, wherein after an initial structural body (C) having a sponge-like base structure and thermally decomposing when carbonized is impregnated with a slurry containing a carbon-supplying resin and either or both of a silicon powder and a silicon alloy, said initial structural body (C) is carbonized at 800°C to 1300°C in an inert atmosphere, so as to form said sponge-like porous structural body (A).

26. (Currently Amended) The method of claim 23~~either one of claims 23 and 24~~, wherein said sponge-like porous structural body (A) has a sponge-like base structure formed by:

impregnating an initial structural body (C) with a slurry containing a carbon-supplying resin and either or both of a silicon powder and a silicon alloy, said initial structural body (C) containing either a polymer compound or a natural fiber, thread or paper with a sponge-like base structure; and

thereafter carbonizing said impregnated initial structural body (C) at 800°C to 1300°C in an inert atmosphere.

27. (Original) The method of either one of claims 25 and 26, wherein:

the sponge-like base structure of said initial structural body (C) has crosslinks having an average thickness of 1 mm or less; and

said sponge-like porous structural body (A) is formed with said initial structural body (C) preserving a shape thereof, using silicon powder and/or a silicon alloy containing silicon and carbon in a Si/C molar ratio of 0.1 to 2.

28. (Original) A method of manufacturing a visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized by the sequential steps of:

immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing silicon carbide and at least one material selected from the group consisting of silicon, a silicon alloy, and carbon and having a porosity of 85 vol% or more;

drying said immersed structural body (A); and

firing said dried structural body (A) at 100°C to 800°C in an oxidizing atmosphere.

29. (Original) The method of claim 28, wherein said sponge-like porous structural body (A) is composed of silicon carbide and either or both of silicon and a silicon alloy.

30. (Currently Amended) The method of claim 28~~either one of claims 28 and 29~~, wherein after an initial structural body (C) having a sponge-like base structure and thermally decomposing when carbonized is impregnated with a slurry containing a carbon-supplying resin and either or both of a silicon powder and a silicon alloy, said initial structural body (C) is carbonized at 800°C to 1300°C in an inert atmosphere and then reaction sintered at 1300°C or above, so as to form said sponge-like porous structural body (A).

31. (Original) The method of claim 30, wherein a sintered compact obtained in the reaction sintering is further melt infiltrated with either or both of

silicon and a silicon alloy at 1300°C to 1800°C, so as to form said sponge-like porous structural body (A).

32. (Currently Amended) The method of claim 28~~either one of claims 28 and 29~~, wherein said sponge-like porous structural body (A) has a sponge-like base structure formed by:

impregnating an initial structural body (C) with a slurry containing a carbon-supplying resin and either or both of a silicon powder and a silicon alloy, said initial structural body (C) containing either a polymer compound or a natural fiber, thread or paper with a sponge-like base structure;

thereafter carbonizing said impregnated initial structural body (C) at 800°C to 1300°C in an inert atmosphere; and

then reaction sintering said carbonized initial structural body (C) at 1300°C or above.

33. (Original) The method of claim 32, wherein said sponge-like porous structural body (A) has a sponge-like base structure formed by further melt infiltrating a sintered compact obtained in the reaction sintering with either or both of silicon and a silicon alloy at 1300°C to 1800°C.

34. (Original) The method of either one of claims 30 and 32, wherein:

the sponge-like base structure of said initial structural body (C) has crosslinks having an average thickness of 1 mm or less; and

said sponge-like porous structural body (A) is formed with said initial structural body (C) preserving a shape thereof, using silicon powder and/or a silicon alloy containing silicon and carbon in a Si/C molar ratio of 0.1 to 2.

35. (Original) The method of either one of claims 31 and 33, wherein:

the sponge-like base structure of said initial structural body (C) has crosslinks having an average thickness of 1 mm or less; and

said initial structural body (C) is impregnated with either or both of silicon and a silicon alloy containing silicon and silicon carbide in a Si/SiC molar ratio of 0.1 to 4, so as to form said sponge-like porous structural body (A) with said initial structural body (C) preserving a shape thereof.

36. (Original) A method of manufacturing a visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized by the sequential steps of:

immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing silicon nitride and at least one material selected from the group consisting of silicon, a silicon alloy, carbon, and silicon carbide and having a porosity of 85 vol% or more;

drying said immersed structural body (A); and

firing said dried structural body (A) at 100°C to 800°C in an oxidizing atmosphere.

37. (Original) The method of claim 36, wherein after an initial structural body (C) having a sponge-like base structure and thermally decomposing when carbonized is impregnated with a slurry containing a carbon-supplying resin and either or both of a silicon powder and a silicon alloy, said initial structural body (C) is heated at 800°C to 1500°C in a nitrogen atmosphere to carbonize initial structural body (C) and to subject the silicon to a nitriding reaction, so as to said sponge-like porous structural body (A).

38. (Original) The method of claim 36, wherein said sponge-like porous structural body (A) has a sponge-like base structure formed by:

impregnating an initial structural body (C) with a slurry containing a carbon-supplying resin and either or both of a silicon powder and a silicon alloy, said initial structural body (C) containing either a polymer compound or a natural fiber, thread or paper with a sponge-like base structure;

thereafter heating said impregnated initial structural body (C) at 800°C to 1500°C in a nitrogen atmosphere so as to carbonize said impregnated initial structural body (C) and to subject the silicon to a nitriding reaction.

39. (Original) The method of either one of claims 37 and 38, wherein:

the sponge-like base structure of said initial structural body (C) has crosslinks having an average thickness of 1 mm or less; and

said sponge-like porous structural body (A) is formed with said initial structural body (C) preserving a shape thereof, using silicon powder and/or a silicon alloy containing silicon and carbon in a Si/C molar ratio of 0.1 to 2.

40. (Original) A method of manufacturing a visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized by the sequential steps of:

immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing amorphous carbon and having a porosity of 85 vol% or more;

drying said immersed structural body (A); and

firing said dried structural body (A) at 100°C to 500°C in an oxidizing atmosphere.

41. (Original) The method of claim 40, wherein said sponge-like porous structural body (A) is composed of amorphous carbon.

42. (Currently Amended) The method of <u>claim 40</u>~~either one of claims 40 and 41~~, wherein after an initial structural body (C) having a sponge-like base structure and thermally decomposing when carbonized is impregnated with a slurry containing a carbon-supplying resin, said initial structural body (C) is carbonized at 800°C to 1300°C in an inert atmosphere, so as to form said sponge-like porous structural body (A).

43. (Currently Amended) The method of claim 40~~either one of claims 40 and 41~~, wherein said sponge-like porous structural body (A) has a sponge-like base structure formed by:

impregnating an initial structural body (C) with a slurry containing a carbon-supplying resin, said initial structural body (C) containing either a polymer compound or a natural fiber, thread or paper with a sponge-like base structure; and

carbonizing said impregnated initial structural body (C) at 800°C to 1300°C in an inert atmosphere.

44. (Original) A method of manufacturing a visible-light-responsive three-dimensional fine cell-structured photocatalytic filter, being characterized by the sequential steps of:

immersing, in a solution containing or generating titanium oxide, a sponge-like porous structural body (A) containing carbon and one metal selected from the group consisting of titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, ruthenium, rhodium, palladium, silver, platinum, and gold and having a porosity of 85 vol% or more;

drying said immersed structural body (A); and

firing said dried structural body (A) at 100°C to 500°C in an oxidizing atmosphere.

45. (Original) The method of claim 44, wherein said sponge-like porous structural body (A) is composed of carbon and titanium.

46. (Original) The method of claim 44, wherein after an initial structural body (C) having a sponge-like base structure and thermally decomposing when carbonized is impregnated with a slurry containing a carbon-supplying resin and powder of one metal selected from the group consisting of titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, ruthenium, rhodium, palladium, silver, platinum, and gold, said initial structural body (C) is carbonized

at 800°C to 1300°C in an inert atmosphere, so as to form said sponge-like porous structural body (A).

47. (Original) The method of claim 44, wherein said sponge-like porous structural body (A) has a sponge-like base structure formed by:

impregnating an initial structural body (C) with a slurry containing a carbon-supplying resin and powder of one metal selected from the group consisting of titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, ruthenium, rhodium, palladium, silver, platinum, and gold, said initial structural body (C) containing either a polymer compound or a natural fiber, thread or paper with a sponge-like base structure; and

carbonizing said impregnated initial structural body (C) at 800°C to 1300°C in an inert atmosphere.

48. (Original) The method of either one of claims 46 and 47, wherein the metal is titanium.

49. (Original) The method of claim 48, wherein:

the sponge-like base structure of said initial structural body (C) has crosslinks having an average thickness of 1 mm or less; and

said sponge-like porous structural body (A) is formed with said initial structural body (C) preserving a shape thereof, using titanium powder containing titanium and carbon in a Ti/C molar ratio of 0.1 to 2.

50. (Currently Amended) The method of any one of claims 25, 26 ~~to 27~~, 30 to ~~35~~33, 37, 38 ~~to 39~~, 42, 43, ~~and 46 to 49~~46, and 47, wherein the slurry further contains at least one powder selected from the group consisting of silicon carbide, silicon nitride, boron carbide, alumina, silica, mullite, and zirconia.